

socket. Purchase one that measures 0-280 N·m (0-200 ft.-lb.).

Impact Driver

This tool might have been designed with the vehicle in mind. This tool makes removal of fasteners easy and eliminates damage to bolts and screw slots. Impact drivers and interchangeable bits (Figure 40) are available at most large hardware) motorcycle or auto parts stores. Don't purchase a cheap one as they do not work as well and require more force (the "use

a larger hammer" syndrome) than a moderately priced one. Sockets can also be used with a hand impact driver. However, make sure that the socket is designed for use with an impact driver or air tool. Do not use regular hand sockets, as they may shatter during use.

Hammers

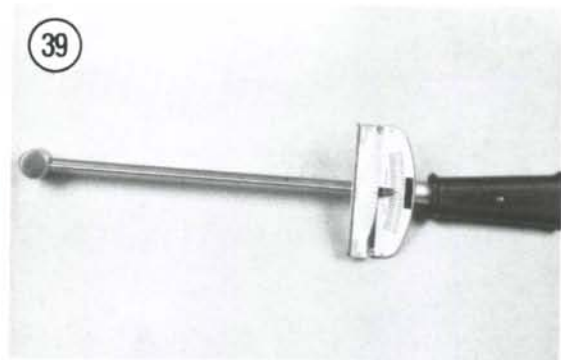
The correct hammer (Figure 41) is necessary for repairs. Use only a hammer with a face (or head) of rubber or plastic or the soft-faced type that is filled with buckshot. These are sometimes necessary in engine teardowns. *Never* use a metal-faced hammer on engine or suspension parts, as severe damage will result in most cases. You can always produce the same amount of force with a soft-faced hammer. A metal-faced hammer, however, will be required when using a hand impact driver.

PRECISION MEASURING TOOLS

Measurement is an important part of motorcycle service. When performing many of the service procedures in this manual, you will be required to make a number of measurements. These include basic checks such as valve clearance, engine compression and spark plug gap. As you get deeper into engine disassembly and service, measurements will be required to determine the size and condition of the piston and cylinder bore, valve and guide wear, camshaft wear, crankshaft runout and so on. When making these measurements, the degree of accuracy will dictate which tool is required. Precision measuring tools are expensive. If this is your first experience at engine or suspension service, it may be more worthwhile to have the checks made at a Honda dealer or machine shop. However, as your skills and enthusiasm increase for doing your own service work, you may want to begin purchasing some of these specialized tools. The following is a description of the measuring tools required during engine and suspension overhaul.

Feeler Gauge

Feeler gauges come in assorted sets and types (Figure 42). The feeler gauge is made of either a piece of a flat or round hardened steel of a specified



thickness. Wire gauges are used to measure spark plug gap. Flat gauges are used for all other measurements. Feeler gauges are also designed for specialized uses, such as for measuring valve clearances. On these gauges, the gauge end is usually small enough and angled so as to make checking valve clearances easier.

Vernier Caliper

This tool (**Figure 43**) is invaluable when reading inside, outside and depth measurements to within close precision. It can be used to measure clutch spring length and the thickness of clutch plates, shims and thrust washers.

Outside Micrometers

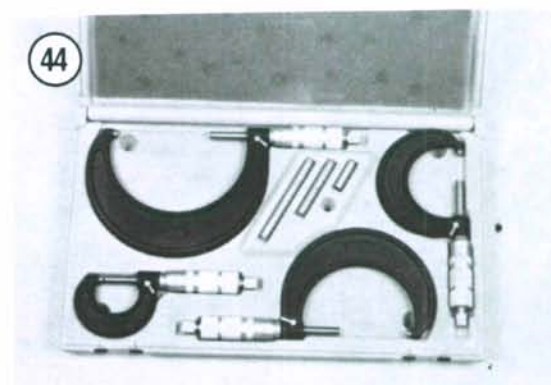
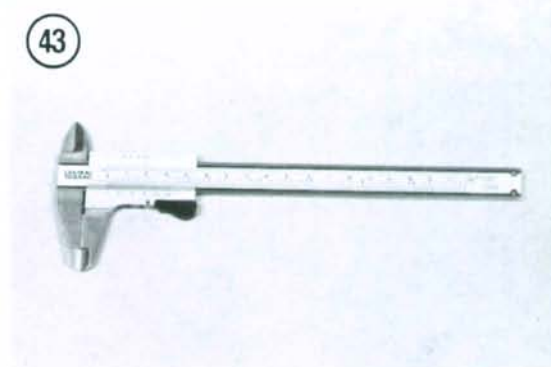
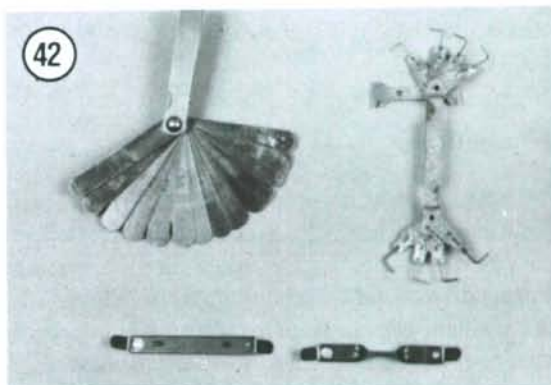
One of the most reliable tools used for precision measurement is the outside micrometer (**Figure 44**). Outside micrometers will be required to measure valve shim thickness, piston diameter and valve stem diameter. Outside micrometers are also used with other tools to measure the cylinder bore and the valve guide inside diameters. Micrometers can be purchased individually or as a set.

Dial Indicator

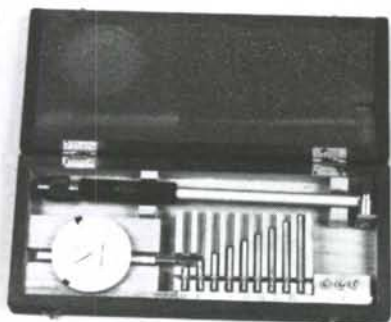
Dial indicators (**Figure 45**) are precision tools used to check dimension variations on machined parts such as transmission shafts and axles and to check crankshaft and axle shaft end play. Dial indicators are available with various dial types for different measuring requirements.

Cylinder Bore Gauge

The cylinder bore gauge is a very specialized precision tool. The gauge set shown in **Figure 46** is comprised of a dial indicator, handle and a number of length adapters to adapt the gauge to different bore sizes. The bore gauge can be used to make cylinder bore measurements such as bore size, taper and out-of-round. Depending on the bore gauge, it can sometimes be used to measure brake caliper and master cylinder bore sizes. An outside micrometer must be used together with the bore gauge to determine bore dimensions.



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Small Hole Gauges

A set of small hole gauges allows you to measure a hole, groove or slot ranging in size up to 13 mm (0.500 in.). A small hole gauge will be required to measure valve guide, brake caliper and brake master cylinder bore diameters. An outside micrometer must be used together with the small hole gauge to determine bore dimensions.

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Compression Gauge

An engine with low compression cannot be properly tuned and will not develop full power. A compression gauge (**Figure 47**) measures engine compression. The one shown has a flexible stem with an extension that can allow you to hold it while kicking the engine over. Open the throttle all the way when checking engine compression. See Chapter Three.

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Strobe Timing Light

This instrument is useful for checking ignition timing. By flashing a light at the precise instant the spark plug fires, the position of the timing mark can be seen. The flashing light makes a moving mark appear to stand still opposite a stationary mark.

Suitable lights range from inexpensive neon bulb types to powerful xenon strobe lights (**Figure 48**). A light with an inductive pickup is recommended to eliminate any possible damage to ignition wiring. Use according to manufacturer's instructions.

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Multimeter or VOM

This instrument (**Figure 49**) is invaluable for electrical system troubleshooting. See testing procedures in Chapter Eight for its use.

Screw Pitch Gauge

A screw pitch gauge (**Figure 50**) determines the thread pitch of bolts, screws, studs, etc. The gauge is made up of a number of thin plates. Each plate has a thread shape cut on one edge to match one thread pitch. When using a screw pitch gauge to determine a thread pitch size, try to fit different blade sizes onto the bolt thread until both threads match (**Figure 51**).

Magnetic Stand

A magnetic stand (**Figure 52**) is used to securely hold a dial indicator when checking the runout of a round object or when checking the end play of a shaft.

V-Blocks

V-blocks (**Figure 53**) are precision ground blocks used to hold a round object when checking its runout or condition. In motorcycle repair, V-blocks can be used when checking the runout of such items as valve stems, camshaft, balancer shaft, crankshaft, wheel axles and fork tubes.

SPECIAL TOOLS

A few special tools may be required for major service. These are described in the appropriate chapters and are available either from a Honda dealer or other manufacturers as indicated.

This section describes special tools unique to this type of vehicle's service and repair.

The Grabbitt

The Grabbitt (**Figure 54**) is a special tool used to hold the clutch boss when removing the clutch nut and to secure the drive sprocket when removing the sprocket nut.

Alternator Rotor Puller

A rotor puller will be required whenever it is necessary to remove the rotor. In addition, when disassembling the engine, the rotor must be removed before the crankcases can be split. There is no satisfactory substitute for this tool. Because the rotor is a taper fit on the crankshaft, makeshift removal often results in crankshaft and rotor damage. Don't think about removing the rotor without this tool.

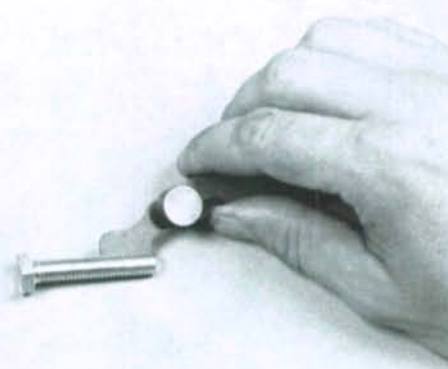
Rear Axle Nut Wrenches

The large 41 mm rear axle nuts require special tools for their removal and installation. These tools are available from a Honda dealer.

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